What Is Claimed Is:

1. A method of crystallizing an amorphous silicon layer, comprising the steps of:

generating an excimer laser beam having a first energy density and a second energy density;

irradiating an amorphous silicon layer of a first thickness with at least one exposure of the excimer laser beam,

wherein the first energy density melts the amorphous silicon layer to a first depth from a surface of the amorphous silicon layer equal to the first thickness and the second energy density melts the amorphous silicon layer to a second depth from the surface of the amorphous silicon layer less than the first thickness.

2. The method according to claim 1, wherein the step of irradiating includes a plurality of excimer laser beam exposures.

3. The method according to claim 2, wherein one excimer laser beam exposure overlaps a subsequent excimer laser beam exposure.

4. The method according to claim 1, wherein the excimer laser beam has an stepped energy density distribution profile.

5. The method according to claim 1, wherein the first energy density is larger than the second energy density.

6. The method according to claim 1, wherein the first and second energy densities each have first and second energy density distribution profiles, respectively, wherein top portions of the first and second energy density distribution profiles are flat.

7. The method according to claim 6, wherein the first crystallizing step energy density crystallizes the amorphous silicon layer.

8. The method according to claim 1, wherein the excimer laser beam includes a first crystallizing step energy density between the first and second energy densities.

9. The method according to claim 1, wherein an energy density difference between the first and second energy densities of about 10 to 15 mJ/cm^2.

10. The method according to claim 1, wherein the excimer laser beam includes a second crystallizing step energy density that has a laser beam width of about 100 to 300 micrometers (μm) and is applied to the amorphous silicon layer after application of the second energy density.

11. The method according to claim 10, wherein the laser beam width is measured at about 10 % of the first energy density.

12. The method according to claim 1, wherein the excimer laser beam is irradiated at about 360mm scan/300Hz and at a ratio of about 20 to 25 seconds per substrate.

13. The method according to claim 12, wherein the amorphous silicon layer includes a plurality of grains of about 3,000 to 4,000 angstroms.

14. An excimer laser system for crystallizing an amorphous silicon layer, comprising;

an excimer laser generator that generates an excimer laser beam having a Gaussian energy density profile;

a beam homogenizer to transform the excimer laser beam into a laser beam having a stepped energy density distribution profile that includes at least a first energy density and a second energy density; and

a filter disposed between the excimer laser generator and the beam homogenizer.

15. The system according to claim 14, wherein the filter includes at least two beam stops.

16. The system according to claim 15, wherein the beam stops include at least a material selected from a group comprising nickel (Ni) and molybdenum (Mo).

17. The system according to claim 14, wherein the first energy density melts the amorphous silicon layer to a first depth from a surface of the amorphous silicon layer that is equal to a first thickness of the amorphous silicon layer and the second energy density melts the amorphous silicon layer to a second depth from the surface of the amorphous silicon layer that is less than the first depth.

18. The system according to claim 14, wherein an energy density difference between the first and second energy densities is about 10 to 15 mJ/cm^2.

19. A method for forming a polycrystalline silicon layer, comprising the steps of:

forming an insulation layer on a substrate;

forming an amorphous silicon layer on the insulation layer;

forming seeds in a bottom portion of the amorphous silicon layer adjacent to an interface between the insulation layer and the substrate; and

converting the amorphous silicon layer to polycrystalline silicon using an excimer laser beam that includes a stepped energy density distribution profile having substantially flat first and second energy density distribution profiles.

20. The method according to claim 19, wherein the step of converting includes a crystallizing step having a third energy density distribution profile between the first and second energy density distribution profiles.